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ASTRONOMY

# American Astronomers in Norway to Observe Eclipse

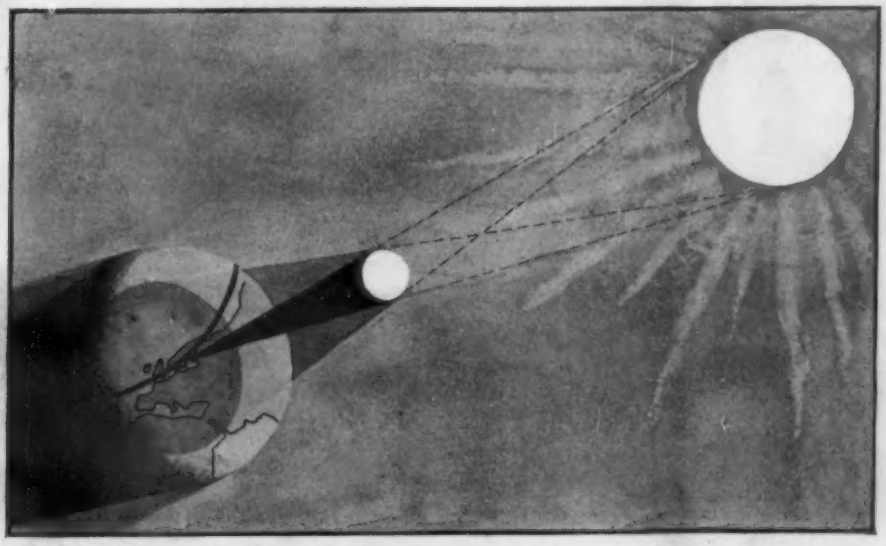

*DIAGRAM SHOWING THE CAUSE OF A TOTAL ECLIPSE of the sun. In the eclipse June 29, the path of totality, shown by the heavy black line, passes over England and the Scandinavian peninsula. People in the large shaded area will see a partial eclipse*

By Dr. Samuel A. Mitchell

*Leader of the McCormick-Chaloner Eclipse Expedition to Norway and Director of the Leander McCormick Observatory of the University of Virginia.*

Next week, on the the 29th of June, the sun will undergo a total eclipse. The moon's shadow, which always stretches out into space behind it, although visible only when it sweeps across the earth, will then touch our globe. Throughout the region that it traverses the sun will be completely obscured, and from behind it will shine the corona, at other times invisible by reason of the sun's glare.

At 5:30 A. M., Greenwich time, or 12:30 A. M., Eastern Standard Time, the shadow will sweep across the Norwegian town of Stavanger, on the southwest coast. It will already have crossed England, and then as it sweeps northward, it will reach Fagernes, in interior Norway, where we have located the McCormick-Chaloner expedition of the University of Virginia. Already our instruments have been set up, and the members of our party are preparing for the crucial moment. With us is Dr. Harlan T. Stetson, of Harvard.

### 50,000 Miles For Fifteen Minutes

The life of an eclipse observer might well be likened to a hunter of big game. Since 1900 I have traveled more than 50,000 miles to witness six total eclipses of the sun. This will be the seventh that I have come to observe. If the weather next Wednesday is clear, and the chances are about fifty-fifty that it will be, I will have seen the sun eclipsed for a total of about 15 minutes in my entire life.

But eclipses are much more wary things to shoot than even the rarest of big game. Many months and even years are spent in preparing for one, in quietly investigating the problems; a costly equipment is accumulated and each piece of delicate apparatus is carefully tested at home to see that it will properly perform its designated function far afield. A long journey, like that which has brought us from Charlottesville, Virginia, to Fagernes, Norway, is usually necessary.

And then, after we have reached our destination, many weeks of preparation are required, in setting up the instruments, cameras and spectroscopes. Each member of our party drills constantly so that the task allotted to him may be well and carefully done, so that the photographic slides may be drawn and each camera lens may be opened at the proper instant.

Success lies in seeing that every one of a thousand possible chances of failure are obviated. At a certain hour, minute and second, the "zero-hour," operations are due to begin. But alas! there may be no "game," the eclipse itself may be eclipsed by clouds, and the long months of preparation may be of no avail since it will not be possible to try again on the morrow when the clouds have rolled away.

Amongst all the wonders of all the wonderful sciences there is no science which deals with such a gorgeous spectacle as that at the moment when the earth is shrouded in darkness, and around the sun appears the matchless crown of glory, the corona. Nor can any science duplicate the wonderful precision shown by the work of the astronomer in his capacity to predict hundreds of years in advance the exact hour and minute at which an eclipse will take place and the locality on the earth's surface where it will be visible.

But what good is a total eclipse? Why should we travel such great dis-

(*Just turn the page*)

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### Coming Solar Eclipse

(*Continued from page* 381)

tances to see it? Until about the middle of the nineteenth century little interest was taken in the subject, although information regarding the sun was comparatively scant. The eclipse was only observed when its track happened to cross the home of the observer, and even then the only observations of value were noting the exact times of contact of the edges of the sun and moon. The beautiful corona was watched with awe and admiration, and some indifferent drawings were made of its form, but it was not even known whether it was a part of the sun or the moon.

### Helium Discovered at Eclipse

At an eclipse in 1868, the spectroscope, which analyzes light from the sun and stars, and tells us what elements compose the heavenly bodies, was applied to eclipses for the first time. Janssen, a French astronomer, found a yellow line at first supposed to be due to the element sodium, most common as a constituent of ordinary salt. But it turned out to be due to an unknown element, which was called helium, because it was discovered in the sun. In 1895 helium was discovered on the earth, now it is used physical science, helium is no less important. It is one of the products of to fill our great dirigible balloons. In such elements as radium, which continually undergo change into other elements.

This is one of the useful things that have come out of eclipse observations, but their fundamental importance is much greater, for they tell us much concerning the sun, and it is on the sun that our very life depends.

The path of totality of the coming eclipse passes over England before it reaches us in Norway. Along the path, from Southport on the Irish Sea to West Hartlepool on the North Sea,

(*Continued on page* 387)

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# Catching Frogs and Spider Webs

The material on this page is furnished by the Coordinating Council on Nature Activities.

## Coordinating Nature Study

Realizing the need for a national program that would coordinate the nature activities of national groups working with young people, the American Museum of Natural History invited these volunteer organizations to form a council to be known as the Coordinating Council on Nature Activities for the purpose of teaching the growing generation, through nature activities, the value of all wild life and natural resources and their conservation. The organizations represented are: American Museum of Natural History, American Nature Study Society, Boy Scouts of America, Camp Directors' Association, Camp Fire Girls, Inc., Girl Scouts, Inc., Pioneer Youth of America, Playground and Recreation Association, and the Woodcraft League of America.

## Mounting Spider Webs

How many of us have walked abroad in the early summer mornings after a heavy dew and have seen glistening in the sunlight the jeweled webs of spiders? These delicate, though exquisitely spun homes vary in size and architectural design, thus making them fascinating material for study and collection. I often wonder how many persons pause to enjoy the beauty and craftmanship of these cunning structures and hope that they might be preserved forever.

One may ask how a thing so sheer as a spider's web may be kept for all time. This is entirely possible, not difficult and intensely interesting to do. There are a few necessary preparations to be made before going into the field. Secure two rectangular pieces of glass, any size suitable to choice, cleanse thoroughly and put aside for later use, as one is not likely to be able to carry them to the field without mishap. Next cut four pieces of cardboard the same size and shape as the glass. Of these, two pieces should have the centers cut out, leaving a rim of one inch in width. Now place the four pieces together with the whole pieces on the outside and fasten securely with a string. This, together with a tube of paste, is all that is necessary to take into the field.

Upon finding the web, unfasten the cord, lay aside the solid pieces of cardboard, place paste upon the rim of one of the remaining pieces and center the web. After centering, put the paste side of the cardboard against the web, hold steady with one hand, and with the free one draw the web over the frame, thus cutting the web loose. Now put the second piece of cardboard, from which the center has been removed, against the pasted side of the other, press firmly, making sure that they stick. Next take up the solid cardboards, place one on either side and tie with the cord, all the while exercising care to avoid pressing against the center. Upon arriving home, remove the covers, and in their stead place the glass, previously prepared, and fasten with binding paper.

The spider web is now mounted, may be freely handled, and should remain a thing of beauty for many years.

—THELMA J. GREENWOOD, *American Nature Study Society.*

## Frog Hunting

There is something fascinating about the night. When darkness covers the familiar scenes of daylight hours, it is easy to imagine ourselves in some strange land with uncanny creatures all about. Many weird sounds come to our ears. As most of them are unknown to us, we tend to believe, as our forefathers did, that they are made by hobgoblins. But night-crying hobgoblins are not so mysterious as they seem. If we take rubber boots and a flashlight and hike out into the darkness and the swamps, we soon discover the source of most of these voices.

One of the commonest night sounds, which may be heard from almost any marsh, pond, or temporary pool, is a shrill "Peep-peep-peep" half whistled, half chirped. It is a strong, penetrating note as if a large creature had produced it, yet it comes from a tiny brown tree frog scarcely an inch in length. With a spotlight, great numbers of the "Spring Peepers" can be seen, swimming about in the water, jumping over reeds like grasshoppers, or sitting patiently on a twig, serenading into the night. The sound is one of the first messengers of spring and may be heard very soon after the snow melts. With every whistle the Spring Peeper swells out his throat into a monstrous bubble or "vocal sac" which collapses as soon as the song is ended.

Along with the Peepers, especially in the marshes and shallow ponds, there may be heard the Leopard Frog, so named because of the bright spots on his coat. The call is an unmusical "kerr-r-or-oak ker-oak" as if a group of old men were arguing about the election. The Leopard Frog has a vocal sac on both sides of his throat. When he calls, he looks as if he had the mumps. Only the male frogs ever sing, and their songs, like those of birds, are primarily love songs. Soon the females respond to the appeal and come out to lay their eggs. These eggs, lying in the water like masses of jelly, can often be found and taken home to develop, first into tiny tadpoles and later into perfectly formed diminutive froglets.

Many people believe that all frogs are alike, that "a frog is a frog." But right in New York City, there are ten varieties, all different in size, color, pattern, habits and song. In woodland pools, we find Wood Frogs "Quack-quack-quack"-ing like so many ducks. They are easier to hear than they are to see, for their coats just match the dry leaves about them.

Large deep ponds usually have different varieties from those of the swamps and pools. It is a favorite sport for boys and girls to explore the banks of these ponds and try to catch the fat Bull Frogs before they leap to the safety of the water. Even at night, the frogs are wary and we have to creep up very carefully without a light in order to see them call for their "Jug o' Rum, Jug o' Rum" or to watch them enjoying their evening repast. Bull Frogs eat almost anything from earthworms and small snakes to mice and birds. I have even seem them devouring their own tadpoles.

Here also may be heard the two calls of the Pond Frog—one a loud explosive "Tchung" and the other a lazy "Tung - Tung - Tung." Many people do not know the distinction between the Pond Frog and the Bull Frog. The former is smaller, greener in color and has two wrinkles down his back.

A third neighbor of the deep ponds is the Pickerel Frog. They usually stay by themselves in a very unsociable way. Perhaps their fellow frogs dislike their "snoring." Evidently they dislike it themselves for I have never found two Pickerel Frogs snoring side by side.

(*Just turn the page*)

### Frogs and Spider Webs

(*Continued from page 383*)

Hop Toads are like frogs, in that they come in great numbers every Spring to lay their eggs in the water. The song is a melodious drone, strangely beautiful to come from such an unattractive creature. It is unfortunate that the toad's looks are so against him, for he is a good-natured and valuable friend. His skin was never known to cause warts and his taste for destructive insects saves us thousands of dollars every year. Toad eggs are laid in long strings of jelly which look like necklaces of jet and crystal. The tadpoles develop very quickly and leave the water when they are no larger than horse-flies. One summer I counted the toadlets which were emerging like a swarm of insects from one side of a Long Island pond. There were more than thirty to every square foot. I estimated that there were over one million five hundred thousand toads leaving that pond at that moment. Imagine how many billions are produced each year! Of course only a small percentage of these survive, the vast majority being eaten by birds, snakes, and fishes, or dried up by the sun.

On Long Island and along the coast there is another kind of toad, with smooth skin and a black horny pad on its heel. It is called the Spadefoot Toad, for it digs with that horny pad. In a short time it can burrow backward until entirely concealed in the sand. When the Spadefoot calls, he swells up his whole body with air, closes his eyes and screams "Wowrrr wowrrrrr."

Anyone who has spent much time in the country, especially around old orchards, has surely heard the high, school-girl trill of the Common Tree Toad. Many people think it is the call of an insect and believe it to be a sure sign of rain. But it is a tree-dwelling frog and like other frogs seems more apt to sing in damp weather, be it before or after rain. It is almost impossible to find a Tree Toad during the day. Their bodies adhere very tightly to the trees, and their skin color changes from gray to green according to the back-ground. But at night in the breeding season they migrate long distances to water-lily ponds, brimming over with song and activity. Sometimes in the midst of their trilling, we hear a strange uncanny sound "Who-Who-Wo." The negroes of Long Island call it the Turkey Root, meaning a bad spirit which calls like a turkey. They are very much afraid of the sound and could not be bribed to go near it. If they did explore, they would only find a lazy Tree Toad, indolently calling with its throat only half inflated.

Most of these frogs and many other creatures are out in the open tonight waiting to be seen by anyone who will throw a spot-light upon them. Frog hunting may not sound as thrilling as lion hunting or bear hunting, but just try it some night and see what genuine sport it can be!

—G. Kingsley Noble *of the American Museum of Natural History,* and Ruth Crosby Noble.

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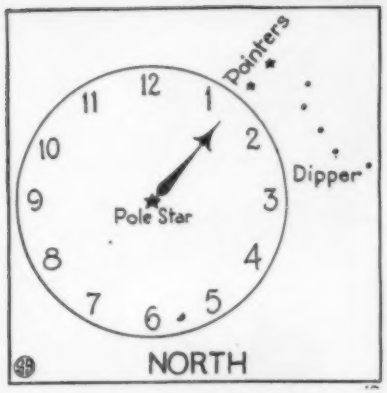


## Time From the Stars

With summer approaching, people are more likely to be out of doors at night, and one never knows when his watch may stop, and he wishes to know the time. If the night is clear, it is easily possible to tell the time from the stars. Of course, most people are familiar with a method of telling the time from one star, for the sun dial tells it from the sun, and the sun is the nearest of all the stars.

However, it is the stars visible at night that serve as the clock face by this method. When the astronomer wants to get the exact time, he observes the passage of stars across the meridian line, with the aid of a transit instrument. Every clear night at the Naval Observatory in Washington, for instance, such stellar observations are made, and the time as found from them is broadcast to the country by radio and over telegraph lines.

No complicated instruments are necessary to tell the approximate time, however, if you remember the following rules, which were prepared by Prof. Chas. C. Wylie, of the University of Iowa. First look at the North Star, and the two "Pointers" in the Great Dipper, which are on a line with it. Imagine that in the sky there is a huge clock face, as shown in the drawing, with the hour hand pointing to the Pointers. Read the time to the nearest quarter hour, which will be easy with a little practice. To this figure, add the number of months since January 1, to the nearest quarter month; double this, and subtract the result from 16¼. If the result is more than 16¼, subtract it from 40¼. The result is the time in hours p. m. If the time is greater than 12, it means that it is after midnight, so subtract 12, and you have the time in hours a. m.

Let us try an example. On the night of June 1 you see the Pointers in the position of 10:45. Five months have elapsed since January 1, so add 10¾ to 5, making 15¾; doubling it gives 31½, and subtracting from 40¼, we have 8¾, which means that the time is 8:45 p. m.

Science News-Letter, June 18, 1927

ENTOMOLOGY

## Worms Noisy But Don't Sing

Earthworms are noisy, but they cannot properly be said to sing, declares the latest participant in the discussion over the vocalizing annelids, Dr. W. R. Walton, entomologist in the United States Department of Agriculture, in *Science*. Qualified persons here admit that Dr. Walton knows his worms, for his specialty lies in a nearly allied scientific field, and he is, moreover, a disciple of the famous Izaak of the same surname and has a critical musical ear in the bargain.

"For 'lo these many days," he writes, "it has been my custom to keep captive, in numbers as large as one hundred or more, adult specimens of the large cosmopolitan earthworm, *Lumbricus terrestris*. They are kept in a five-gallon earthenware crock in a cool corner of the cellar for use in a pursuit which in some states of the Union is considered immoral, or at least illegal, when indulged in on Sunday. In the course of my dealings with these worms I have many times heard the sounds recently referred to as 'singing' and, although personally fond of music, have failed to notice anything in the least musical about these faint clicking sounds or stridulations, recently termed 'song.' The singing of insects, for instance, could be considered as symphonic poems when compared with these insignificant rustlings."

Dr. Walton's observations seem to stand against a theory advanced earlier: that the worms make the sounds by rasping the minute bristles under their bodies across pebbles at the mouths of their burrows. He says that they produce their sounds when they are kept in moist moss, where there is, of course, nothing to rasp on, and that, moreover, he has heard the noises when the worms were all underground in their imprisoning crock. He reports that it is extremely difficult to make observations on the worms, for they become noisy only at night, and although they have no eyes they are still extremely sensitive to light and retreat into their burrows instantly if a light strong enough to see by is turned on them.

Science News-Letter, June 18, 1927

SAMUEL ALFRED MITCHELL

## Eclipse Chaser

Fifty thousand miles to parts of the earth's surface from Norway to Sumatra is the record of Dr. Mitchell in his chase after eclipses of the sun, for he is one of the world's champion eclipse hunters. Even now he is in the little Norwegian town of Fagernes, preparing to make the most of the brief moments on June 29, when the path of a total eclipse sweeps across England and Scandinavia. But where other eclipse observers have made photographs of the corona, or measured the brightness of the eclipse, Dr. Mitchell has specialized in the flash spectrum, the last sliver of sunlight that shines just before totality commences, and the first that reappears after it is over.

But eclipses do not occur every day, and in the rest of his time Dr. Mitchell has also performed valuable work, in measuring the distances of the stars, for the Leander McCormick Observatory, of which he is a director, is one of the chief centers of parallax measurements.

A Canadian by birth, Dr. Mitchell graduated from Queen's University, Canada, with the degree of M. A., in 1894, and 30 years later the same institution gave him its Doctor of Laws. But he has been an American by adoption for many years, for he received his Ph. D. from Johns Hopkins in 1898. From there he went to Columbia until 1913, when he was called to the directorship of the Leander McCormick Observatory of the University of Virginia in 1913, where he still remains.

Science News-Letter, June 18, 1927

# ZEISS

## PLANETARIUM

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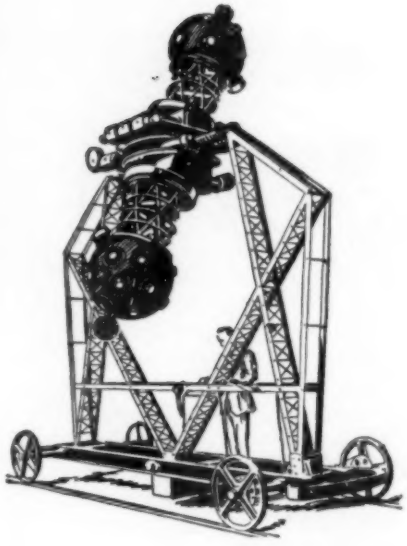
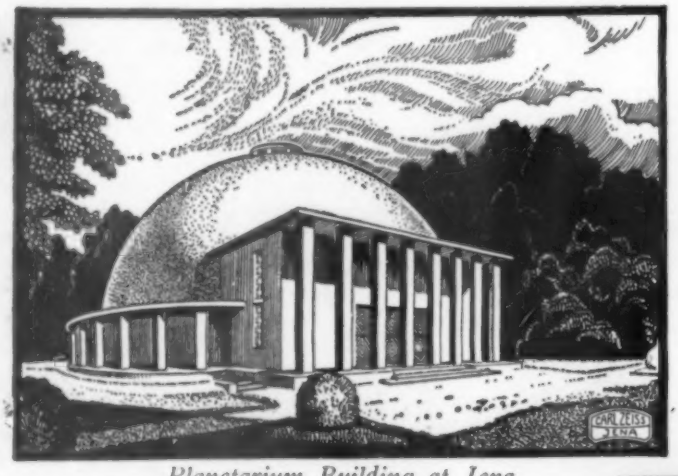
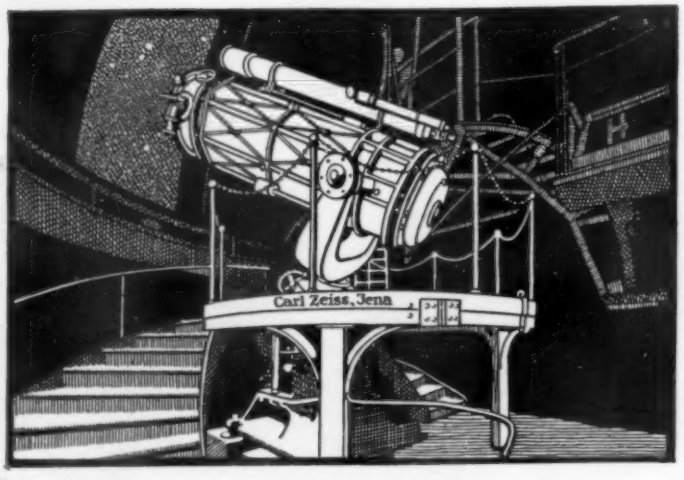





*Planetarium Building at Jena*

or will appear at any time, past, present or future, as seen from any place in the world. There are now ten Zeiss Planetariums in operation and another six under construction.

## OBSERVATORY TELESCOPES




*Reflector of the Observatory at Heidelberg, constructed by Carl Zeiss. Aperture 720 m/m (28¼ in.), focal length 2.8 m (11¾ ft.).*

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*PATH OF TOTALITY IN EUROPE of the Total Eclipse of the Sun, June 29, 1927*

### Coming Solar Eclipse

(*Continued from page* 382)

British astronomers and interested laymen, will be gathered to make the most of the 24 seconds that the total eclipse will last at the center of the path. In England, the total phase occurs about 5:25 A. M. Greenwich time. Weather experts estimate that there is only about one chance in three of the eclipse being seen in England, and for that reason the McCormick-Chaloner expedition has picked out Norway, where the chances for clear weather are about even.

### First in England in Two Centuries

But despite the probably poor weather conditions in England, no recent astronomical event has attracted so much popular interest. The last chances that Britishers had to observe eclipses were on May 2, 1715, and May 22, 1724. Both of these were observed by the great astronomer Halley, who is known to us as the discoverer of the periodic character of Halley's comet. If clouds prevent observations next week, British astronomers will have a long wait ahead of them for the next eclipse, because it occurs on Angust 11, 1999. Then it will just touch the southwestern tip of Cornwall.

### Chances Better in Norway

Besides being a little later in the morning in Norway than in England, and with the chances for clear weather better, the eclipse there will last a little longer. At Fagernes, where we are located, it will last about 34 seconds, or 10 seconds longer than in England. For photographs of the corona, made with a large camera during the time that the sun is completely obscured by the moon's disc, these extra seconds are precious. They will enable us to make longer exposures, and so to record the outermost extensions of this delicate structure, which take a long time to record themselves on the photographic plate.

What does the corona consist of? and whence comes its light? Its feeble light has been traced to the enormous distance of ten millions of miles from the sun's surface. It cannot be a true atmosphere consisting of gaseous particles for, if it were, the pressure at the sun's surface would be colossal, and we know for certain that such pressures do not exist. As a further proof we know that occasionally comets come close to the sun's surface, dashing by the sun at the rate of a hundred miles per second—and yet the comet goes through the corona without any friction and without any perceptible impeding of its velocity, which would be impossible if the corona contained much matter. The only true atmosphere possessed by the sun is the chromosphere which stretches up to a maximum height of 10,000 miles.

When the light from the sun is analyzed by means of the prisms of a spectroscope, the resulting spectrum shows a bright band of color crossed by numerous dark lines. Each of these lines is due to some particular element in the sun, and by their aid we can tell of what substances the outer layer of the sun is made.

### What is the Corona?

We must rely mainly on the spectroscope to give information on the constitution of the corona. On account of the feebleness of its light it is almost impossible to use a spectroscope as powerful as one that we can use on the sun itself. None of the lines in the spectrum of the corona, amounting to about forty, have been identified with terrestrial sources. The strongest line in the whole spectrum is in the green, at wave length 5303. This belongs to the mysterious and unknown element "coronium". Part of the coronal light takes its origin from the gaseous coronium which gives a spectrum of bright lines, and part by sunlight reflected from the molecules of the corona, since a dark spectrum is also observed. It has been difficult to decide whether the reflection and scattering of the ordinary sunlight is in the corona itself or whether it takes place in our terrestrial atmosphere. At the eclipse of 1922 in Australia, Dr. Moore of the Lick Observatory secured some very valuable observations.

Many astronomers have attempted to photograph the corona in full sunshine, using many different kinds of instruments, while high mountains like Pikes Peak and Mount Blanc were ascended in order to get above the heavier strata of the earth's atmosphere. But all to no avail! The work of Dr. Abbot, of the Smithsonian, Prof. Stebbins, of the University of Wisconsin, and others have told the reasons, namely that the coronal light is excessively feeble compared with sunlight. This brings the unfortunate conclusion that investigations of the mysterious corona must forever be confined to the few brief moments of a total eclipse.

Although Dr. Stetson will make observations of the heat of the corona, for the main purpose of our expedition, the short duration of totality at this eclipse is unimportant. I have

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*HOW THE ECLIPSE WILL PROBABLY LOOK IN ENGLAND. This drawing is based on one made for the British Admiralty*

### Coming Solar Eclipse

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always been chiefly interested in what we call the "flash spectrum."

If we could get the light from inside the sun through our spectroscopes, without its having traversed the outer layer, or "chromosphere," it would look like a spectrum from a white hot poker, or the white hot filament of an electric bulb, that is, the dark lines would not be present, and instead the spectrum would be a continuous band of color. But if the light comes from a glowing vapor, such as that of sodium, which can be obtained by putting a pinch of salt in a colorless gas flame, the spectrum will show only two bright yellow lines, close together. Similarly other elements besides sodium will each give a characteristic "bright line" spectrum.

#### Spectrum Shows Dark Lines

Now, if the light from an incandescent electric lamp, which is much brighter than the sodium light, shines through the glowing vapor in the flame while we examine the spectrum, we see a bright band of colors crossed by two dark lines in the same position as the two bright lines of the spectrum of sodium alone.

The outer layer of the sun—the chromosphere—resembles the sodium flame, because it consists of glowing vapors. As the light from the hot interior of the sun passes through it, some of the colors are absorbed, not only those corresponding to sodium, but iron and many other elements as well. The result is the solar spectrum that we ordinarily see. The only time that it is possible to see the light from the outer layer by itself is at the time of a total eclipse.

When the moon's disc crosses the face of the sun, and completely covers its surface, the total eclipse begins. At this instant the narrow crescent of the chromosphere shines for a few seconds only until covered by the advancing moon. At that moment the only light that reaches the earth comes from this layer of glowing vapors, and the spectrum, shows a series of bright crescent-shaped lines. The image of the chromosphere layer appears in the light of each of the elements that it contains, and effects can be studied that are visible at no other time. The flash spectrum is visible for 3 to 5 seconds just at the beginning and at the end of the total eclipse. Consequently, for photographing the flash spectrum, a short duration of totality like that of the 1927 eclipse is just as good as the longest possible duration of seven minutes.

#### Tells Heights of Vapors

One advantage of the flash spectrum is that we can tell from it the height of the elements in the chromosphere. Take a penny and a dime out of your pocket. Lay the dime down with the side upon which appears the words "United States of America" uppermost. This will represent the sun, and the circular inscription the chromosphere. Now slide the penny, which represents the moon, over the dime. The penny is a little larger than the dime, just as the moon disc is apparently a little larger than that of the sun at the time of a total solar eclipse. Place the edge of the penny right under the initial "S" in "States," and you have a model of the conditions prevailing at the time the flash spectrum is visible.

All the rest of the sun is now covered, the only light comes from the chromosphere. Notice the bottoms of the letters. Only the bottom of the "S," and perhaps the "T," is visible. The tops of more letters are visible, from the top of the "N" in "United" to the top of the "O" in "of." And as for the edge of the dime, it is visible half way around.

This is similar to what happens at the time of the flash spectrum. The higher layers in the sun's chromosphere are represented in photographs by the longer crescents. By measuring the lengths of these crescents, we can calculate the heights of the different gases in the chromosphere. If the moon's diameter, as seen from the earth, is only slightly larger than the sun, as at this eclipse, some of the outermost elements in the flash spectrum may show as complete circles.

The sun is the nearest of the fixed stars, and it is the only star which permits us to examine its atmosphere in detail at the time of a total eclipse. A knowledge of the heights attained by the solar vapors gives information regarding the pressures under which the spectroscopic lines take their origin. At very reduced pressures in the sun's chromosphere and at the high temperature found there it is readily possible for an atom to lose an external electron and become ionized. The spectrum of the ionized atom differs very much from that of the neutral atom which has not lost an electron. In the ionized spectrum certain lines are enhanced in intensity and these are the lines which are stronger in the spectrum of the electric spark than in the electric arc. Knowledge of these things are of the very greatest importance in furthering our knowledge of the chemical atom, a quest in which astronomy, physics and chemistry are vitally interested.

And so, with the other astronomers who have come to Norway, we are anxiously awaiting the 29th. We are the only American party, but nearby are numerous parties of astronomers from European countries. If the weather is clear, and we make our observations successfully, we will have the material for many months of study; if the weather is cloudy, then, at least, we can feel that we have done our duty.

Science News-Letter, June 18, 1927

About $25,000 worth of gold is mined each month in New South Wales.

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May-flies that live as winged adults only one night have only a trace of mouth and digestive apparatus.

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The first radio beacon south of the equator has been established near Cape Maria Van Dieman, New Zealand.


## Eclipses of the Sun

**By S. A. Mitchell**

*Director of the Leander McCormick Observatory*

The author will head the only American expedition to observe the eclipse which will be visible in Norway, June 29th. He will then have travelled more than 65,000 miles to witness seven solar eclipses for a total period of sixteen minutes.

Professor Mitchell's book contains the most complete consideration of solar eclipses that has appeared in any language. The gradual accumulation of scientific knowledge concerning the most spectacular phenomenon in nature is traced from the first recorded eclipse in China in 2137 B. C. to the American eclipse of 1925. Chapters explain The Prediction of Eclipses, The Spectroscope, The Flash Spectrum, The Surface of the Sun, The Corona and The Einstein Theory of Relativity.

The book is written so that the layman can understand it. It is illustrated with reproductions of paintings of the corona in natural colors, and of many photographs, together with mathematical diagrams and charts.

Second edition: 470 pages, 66 plates, $5.00

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EVOLUTION

## Anti-Evolution in Florida

The anti-evolution bill before the Florida legislature passed the House, amended to the point of emasculation, a short time before adjournment. It immediately became the subject of hot and bitter controversy in the Senate, but finally died in the hands of the committee to which it had been assigned, when the legislature adjourned. The proponents of the measure now declare their intention of making an election issue of the matter, and since most of the newspapers are not in sympathy with them they are carrying on their campaign by means of circulars, distributed most heavily in the districts of legislators who opposed the bill. Several of these have expressed acute resentment at such tactics, and an acrimonious fight is in prospect.

The amended measure forbade the adoption of "any text book which teaches as fact any theory that denies the existence of God, that denies the divine creation of man, or which teaches atheism or infidelity, or that contains vulgar, obscene or indecent matter." This bears little resemblance to the original bill, which was patterned closely after the Tennessee law which gained notoriety in connection with the Dayton trial two years ago.

One of the last acts of the legislature was the passage of a resolution calling for a committee to investigate the text books used in the state-supported colleges. This brought forth vehement protests, and one of the protestants, the editor of the Florida State News, was denounced on the floor of the Senate and finally denied the privilege of entrance there. He returned the fire with an editorial barrage that smacked of eighteenth-century political invective. "The spectacle, and the language used, has no parallel in the history of the state. It was the language one would expect to hear on the docks and levees," he concluded. Thereafter the Senate reversed its action, and not only readmitted the editor but added his name to the list of newspaper representatives which it deemed worthy of special commendation.

Throughout the fight the independent colleges of the state, which would not be affected in any way by the passage of anti-evolution legislation, have for the most part stood stoutly by their threatened colleagues in the state institutions.

(*Just turn the page*)

PHYSIOGRAPHY

## Flood Due To Sinking

The slow sinking of the lower Mississippi valley, closer and closer to sea level, is suggested as one of the possible causes of disastrous floods like the one now raging, in a geological essay prepared by Dr. David E. White of the National Research Council for the meeting in Washington of the American Shore and Beach Preservation Association. The Gulf coast is not known to be sinking, but that may be simply because adequate studies have not yet been made of it, Dr. White stated. He pointed out the well-known fact that the Atlantic coast is sinking at the rate of about a foot a century as of importance in this connection.

"Geologists do not know whether a portion of the lower Mississippi basin is now being depressed as the result of downward bending of the crust of the earth in this region of the continent," Dr. White continued, "but they do know that there has been downward movement of very late date, geologically spaking, in this part of the Gulf coast. Some geologists believe the movement to be still in progress. Further, the well-known occurrence of earthquakes in the stretch of the valley between Cairo, or New Madrid, and the Memphis region shows that movement, with probable warping or dislocation of the outer part of the crust, is going on in that part of the valley. The earthquakes are unmistakable signs of such changes, mostly out of sight, in the buried strata.

"Finally, it has long been known and has recently been confirmed that the region to the north embracing the Upper Great Lakes is now being tilted, the area on the north being in process of rising higher above tide level than the area to the south. Somewhere to the south there should hinge a line, if there is no bending, to the farther southward of which depression or sinking, probably with some warping or twisting of the crust, may now be going on with perhaps as much certainty as earthquakes happen between New Madrid and Memphis.

"If a part of the Gulf coast embracing the lower Mississippi reaches is now subsiding, the rate of sinking will be so slow as to be imperceptible except by scientific methods, and the effects may appear negligible at first thought; yet such a movement, however slow, would be of ultimate far-reaching significance, for it must gradually in the course of time cause

(*Just turn the page*)

ETHNOLOGY

## Indians Celebrate Solstice

By Albert B. Reagan

Midsummer festivals are observed by practically all the religions of the world, and the American Indian customs show no exception to this rule. Of all the native peoples, perhaps none have more elaborate modes of observance than those of the Pueblos, who combine their own age-old observance with those of a partially absorbed Christianity, and transfer their tribal feast-days to coincide with those of the saints of the Church.

The summer solstice begins June 10, according to the Jemez reckoning, and the winter solstice about November 27. At these times the Snake Society goes into retreat in the kiva to pray for rain. After a number of days the men emerge. Then follows the Fiesta of San Juanito or St. John, on June 24.

After mass at the church on this day the image of the saint is carried to a booth in the plaza by a procession from the church. Soon a dance in honor of the saint is begun. It is a double-column *tablita* affair, in which clowns often play a conspicuous part.

Accompanying this dance is a mock torrel combat, or bull burlesque, which keeps up a general hurrah through the entire day. In this peculiar mock performance a man leads a mock bull made of a bull hide, or a black cloth, spotted all over with white rings, stretched over a wooden frame supported by two or more men inside it. He enters the plaza, followed by a dozen or more dirty, shabbily dressed, slouch-hatted boys and men, representing white and Mexican cowboys. Their faces and hands are painted white; one wears a head of red hair, another a false moustache. Some are garlanded with yellow flowers, and circles within circles and "U. S. A." are chalked on the backs of their coats.

At intervals these cowboys tease the bull with sticks till he gets enraged, belows, and charges upon them. Feigning to be overcome they fall before him in the mud and water, and are trampled under foot by the enraged "beast." The "beast" then charges upon whomever may chance to be in the street at the time, making women scream and scaring children. The keepers, after wallowing in the mud till it would be hard to

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### Indians Celebrate Solstice

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tell by their appearance that they were human beings, make chase after it, and after much cracking of whips, bellowing and hallooing they recapture it. In the intervals while the mock bull is quiet its keepers take it from house to house, and from the inmates receive offerings of bread and other eatables, to be presented as an offering to the gods whose symbols are in the kivas.

A feast is then spread in front of the quarters of this society, while the "bull" rests at the foot of the adjacent kiva ladder. The antics are then renewed, and the cowboys lasso him again and again. About the plaza he drags them, breaking away from them time after time, often charging upon and upsetting the table and scattering the eatables.

At this juncture a bugler steps out of the Eagle Watcher's house and plays: "A Hot Time in the Old Town To-night," "Wedding Bells," "Yankee Doodle," "Tipperary," and so on, as the bull baiters, now semi-clowns, dance clumsily about the plaza until darkness closes the festivities.

Science News-Letter, June 18, 1927

A Fascinating Story

MODERN ASTRONOMY

By HECTOR MACPHERSON

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*Swarthmore College.*

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### Flood Due to Sinking

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slackening of the currents; it must slowly render it more difficult for the river to keep its lower trench clear from filling by sediments, and it must carry regions subject to flood lower down and nearer sea level, except as, on the other hand, these regions may be built up at the same time by flood contributions of sediments derived primarily from the higher lands or by organic debris, accumulating especially in the swampy areas.

"It is important that the question of the slow subsidence of any part of the lower portion of the Mississippi trench system be definitely determined by scientific and engineering observation and research. If downward movement is now in progress we must know the rate of subsidence, and if this rate is sufficiently great, engineering plans, if they are to be permanently successful, should take cognizance of the fact and be adapted to counteract its effects. This is a research problem of national scope as well as importance, and should be thoroughly organized, carefully manned and carried to conclusions, possibly under Government auspices, with such collateral aid from state agencies of a kind fitting into a well-planned research program as may be forthcoming from the states concerned."

Of more local and immediate importance, Dr. White suggested, is the question of the silting up of the river channels. The levee system is based partly on the assumption that the streams confined therein will scour their own channels clean, but to date nobody has taken the trouble to find out whether this actually happens. If the rivers really drop their loads of silt and sand on their bottoms instead of carrying them out to sea and dumping them there, according to current engineering assumptions, eventually the bottoms of the rivers will be higher than their banks, and the game of levee-versus-river can go on upward indefinitely, but always with increasing peril to the lowlands. A geological study of river-bottom deposits, Dr. White stated, can be made in a few years at relatively small expense, and he recommended that steps in that direction be taken immediately.

Science News-Letter, June 18, 1927

A method of making sugar from sawdust was recently reported by a British chemist.

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Machines which cut weeds under water are being used in reclaiming swamp lands of Florida.

### Florida Anti-Evolution

(*Continued from page* 389)

An outstanding figure has been Pres. Hamilton Holt, of Rollins College, at Winter Park. In a statement to the New York *Times,* Pres. Holt announced that he had refused a substantial gift to his college which had been offered with the proviso that the teaching of evolution be dropped from the curriculum. Pres. Holt outlined his credo on the freedom of teaching as follows:

"A college that is in any respect limited in seeking or teaching the truth, is to the extent of that limit a propaganda institution. A college that limits its own freedom is a propaganda institution by choice. A college that is required to limit its freedom is a propaganda institution by compulsion . . . . I consider it the duty of those entrusted with the education of youth, in a crisis of this kind, not to take the easy and safe course of silence but to make public their convictions. I deem it an honor to be associated with a faculty whose members take these views."

Science News-Letter, June 18, 1927

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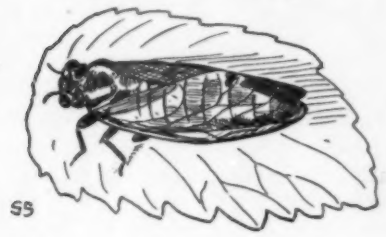
BIOLOGY

# NATURE RAMBLINGS

By FRANK THONE



### Seventeen Years

In numerous places all over the United States this spring there will be a sudden appearance of hosts of large, brown, clear-winged insects, creeping up the trunks of trees, flying about aimlessly and rather feebly, and then suddenly disappearing again, leaving as a reminder of their visit only a lot of trees with more or less killed-off twigs and withered leaves. It is unfortunate when these happen to be apple or other fruit trees, but this does not often happen.

Oldest inhabitants will say, "Yes, they were here in 1910, and before that in '93, but the worst was the time they came in '76. They're seventeen-year locusts, that's what they are."

To insist on a chilly accuracy, they are cicadas, not locusts; for locusts are grasshoppers. But the seventeen-year part of it is right. The seventeen-year cicada does come every seventeen years—with a few forerunners the year in advance and a few stragglers the year after—and he is the longest-lived insect in the world, so far as we have any knowledge.

The brief life of the insects when they appear is really only their swan-song. Before that they have existed as crawling grub-like creatures for seventeen years underground, feeding on the roots of plants. When their time comes, they emerge, shed their underground clothes, live their few days in the sun, mate and lay their eggs, and thus initiate the cycle over again. The eggs are laid in the tender bark of young twigs, which are killed by the feeding of the newly hatched grubs. Later the larvae drop to the ground and dig themselves in for their long subterranean existence.

Science News-Letter, June 18, 1927

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Motion pictures of surgical operations are being made in natural colors in Germany.

ANATOMY

# Identify Body With X-Rays

Will the all-penetrating X-ray replace fingerprints as a weapon for tracking down criminals? A spectacular case, the first on record, in which the identification of a person has been obtained through the use of X-ray photographs is described in a report just made to the American Medical Association by Drs. William Ledlie Culbert and Frederick M. Law, of New York City.

In January, 1920, Dr. Culbert operated on a man, designated as J. L., for mastoiditis on the left side, a procedure that relieved chronic headache. As is usual in such cases several X-ray studies were made of the face and head.

"In 1925 this patient," said Dr. Culbert in his report, "went to India and wrote to his family of his intention of going into Thibet; as entry was forbidden by the Indian government, he stated that it would be necessary for him to 'disappear'; i. e., to drop officially out of sight. In the meantime he gathered his caravan together and encamped temporarily with some friends on the banks of the Indus River in Kashmir. June 8, 1925, great alarm was occasioned by his sudden disappearance, and search was started along the river. Seventeen days later, the bodies, first of one white man, and then of another, both badly dismembered and disfigured beyond any possibility of recognition, were found in the river, 70 miles below camp. We were appealed to by the family for possible means of identification and suggested the scar of a simple mastoid operation on the left side."

One of the bodies showed such a scar and was shipped to New York. J. L. was heir to much real estate to which title could not be given without positive identification, which was made increasingly necessary because of the written statement of J. L. to his family of his intention to disappear into Thibet. The body was terribly disfigured.

"On being asked if we could furnish means of more positive identification, we replied unhesitatingly that we could do so, for we still held in our possession roentgenograms of the nasal accessory sinuses and of both mastoid bones of J. L., taken in 1918. We had noted in many other cases the absolute identity of roentgen-ray pictures taken of these structures, in the same patient, after lapses of five, ten, fifteen or more years. Although we had never before had occasion to use the fact, as shown by roentgenograms, of the unchanging shape, size, contour and relation to neighboring structures of the pneumatic cells of the skull as a means of personal identification, these facts could unquestionably so be used."

The second set of X-ray pictures established conclusively the identity of the slain man. In both sets the nose wall of the orbit of the eye was curved more on the right than the left and the upper curve of the right eye-socket was slightly flattened in both pictures. Various other formations of the bones of the face were found to correspond. The identification was further confirmed by the recognition of the three gold inlays in the teeth of the body by the dentist who had attended J. L. in 1924 and 1925.

The whole subject of roentgenography of the head as means of identification for criminals has barely been touched, the doctors believe. It offers advantages over finger printing in that finger tips can be intentionally mutilated and for some reason the head seems to be preserved more often than the hands in many of the more gruesome murder cases. Any amount of deforming surgery, moreover, cannot destroy the identifying landmarks of the skull bones.

Science News-Letter, June 18, 1927

ASTRONOMY

# Australian Discovers Comet

A new comet of the eighth magnitude, too faint to be seen with the unaided eye, but bright enough to be observed with a small telescope, was discovered on June 7 by Walter F. Gale, a Justice of the Peace of Sydney, Australia, who spends his spare time observing stars. This is according to reports reaching the Harvard College Observatory, it was announced by Dr. Harlow Shapley, director of the observatory. However, stated Dr. Shapley, the discovery has not yet been confirmed.

According to the report, the comet was in the constellation of Piscis Australis, the southern fish, a star group that is seen low in the southern sky now about 3.30 a. m. However, in Australia, this constellation would be nearly overhead.

Its position, as astronomically expressed, was then 21 hours and 38 minutes in right ascension and 31 degrees 38 minutes in south declination.

Science News-Letter, June 18, 1927

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## First Glances at New Books

OLD CHEMISTRIES — Edgar Fahs Smith—*McGraw-Hill* ($2.50). A book describing the textbooks in chemistry used in America by our fathers and grandfathers, by the leading authority on the history of American science. The author gives a hint of the vast stores of early literature relating to chemistry in the hope that some time the history of chemistry will be given its place in the curriculum of studies in every institution of learning where the science itself is studied. The value of the book lies largely in its numerous facsimile pages and portraits of early chemists.

Science News-Letter, June 18, 1927

AN EXPERIMENT WITH TIME—J. W. Dunne—*Macmillan* ($2.50). In which the author accepts the idea that time is a fourth dimension, and tries to demonstrate that in our dreams both directions in the time-dimension are represented; i. e., that our dreams are made up partly of past and partly of future events. An interesting work, whether true or not.

Science News-Letter, June 18, 1927

THE LOGIC OF MODERN PHYSICS —P. W. Bridgman — *Macmillan* ($2.50). A discussion of the philosophy of physical science in the light of such modern concepts as the theory of relativity and the quantum theory.

Science News-Letter, June 18, 1927

HARVARD TESTS: HIGH SCHOOL CHEMISTRY, Forms A and B—Henry L. Gerry—*Ginn* ($.48 per pad of thirty, each form). Methods made popular in group intelligence tests applied to chemistry to form a test that should give a more accurate idea of the student's knowledge than with the older methods.

Science News-Letter, June 18, 1927

WHAT IS THE ATOM?—E. N. da C. Andrade—*Harper* ($1). A concise (78 pages) account of the modern theory of how atoms are made.

Science News-Letter, June 18, 1927

ABSTRACTS OF THESES: SCIENCE SERIES, VOL. III, 1924-1925—*Univ. of Chicago Press* ($3.) Continuing a series embodying a most worth-while idea. It would be a most excellent thing if all universities supporting schedules of graduate work here were to issue similar books.

Science News-Letter, June 18, 1927

WHAT AND WHY IN CHINA—Paul Hutchinson—*Willett, Clark & Colby* ($1). Reading these 130 small pages, or even the four-page chapter entitled "In a Nutshell" will give the average citizen a clearer understanding of the Chinese puzzle than he is likely to get from the daily perusal of the columns he gets in his morning paper. If this new firm of publishers will follow the start of this first issue and get out just what we need to know at just the time when we want to know it, they will contribute greatly to the spread of usable knowledge.

Science News-Letter, June 18, 1927

WIRELESS PICTURES AND TELEVISION—T. Thorne Baker—*Van Nostrand* ($5). A concise history of the problem and the various attempts at its solution, which is fairly complete, though it pays particular attention to British methods, especially that of the author, and is not sufficiently recent to mention the highly successful television process of the Bell Laboratories.

Science News-Letter, June 18, 1927

OUR AMERICAN GAME BIRDS—L. B. Hunt and E. H. Forbush—*E. I. Du Pont de Nemours & Co.* ($2.). A series of 20 beautifully colored prints, each 10 by 11 inches, illustrating 37 of the better known American game-bird species, with text on the back briefly describing range and habits and giving notes of interest to the hunter.

Science News-Letter, June 18, 1927

ARE YOU INTELLIGENT?—Howard W. Haggard — *Harper*. The Yale physiologist who has turned out this little volume found the Army Alpha intelligence test, evolved by wartime psychologists so satisfactory that he has made only microscopic changes in the various items which he has chosen to use. The Alpha test for "following directions," for some reason, is omitted.

Science News-Letter, June 18, 1927

THE FLORA OF BARRO COLORADO ISLAND, PANAMA—Paul C. Standley —*Smithsonian Misc. Coll.* v. 78, *no.* 8. An annotated checklist which will be very useful to botanists sojourning in Panama.

Science News-Letter, June 18, 1927

PROCEEDINGS OF THE SIXTH ANNUAL MEETING OF THE HIGHWAY RESEARCH BOARD—*National Research Council*. A complete report of the last meeting of the organization that is making a scientic study of how we may have better roads.

Science News-Letter, June 18, 1927

PLANTS OF THE PAST—Frank Hall Knowlton — *Princeton Univ. Press* ($3.50). A most excellent book for the general reader or for a beginning course in paleobotany. The author does not even assume a previous knowledge of either botany or geology on the part of his audience, yet he succeeds in making his exposition clear without any distasteful flavor of "writing down."

Science News-Letter, June 18, 1927

PHYSIOLOGY AND BIOCHEMISTRY IN MODERN MEDICINE—J. J. R. Macleod—*Mosby* ($11). This standard textbook for medical students has been rewritten and expanded in this edition to bring it up to date with recent advances in the science of physiology.

Science News-Letter, June 18, 1927

TEXTBOOK OF COMPARATIVE PHYSIOLOGY—Charles Gardner Rogers—*McGraw-Hill*. Not a medical physiology but a comparative survey of the principal animal functions in the different animal groups.

Science News-Letter, June 18, 1927

THE GENERAL THEORY OF THERMODYNAMICS — J. E. Trevor — *Ginn* ($1.60). Though of only 102 pages, this little book forms a complete introduction to the study of thermodynamics. Previous acquaintance with the calculus of functions of more than one variable is assumed.

Science News-Letter, June 18, 1927

INTERMEDIATE COTTON SPINNING —Thomas Thornley—*Van Nostrand* ($7.50). A concise treatise on cotton spinning, especially intended as a text for trade schools, but equally valuable for anyone who wants to learn about this phase of textile manufacture.

Science News-Letter, June 18, 1927

THE LAW OF CHEMICAL PATENTS — Edward Thomas — *Van Nostrand* ($6). A book for both the chemist and the lawyer, for it tells what is and what is not patentable and how chemical inventions can best be developed.

Science News-Letter, June 18, 1927

COFFEE — R. H. Cheney — *N. Y. Univ. Press*. A thorough-going monograph, covering botanical, chemical, commercial and historical aspects of this most important beverage-berry.

Science News-Letter, June 18, 1927

IDYLLS OF THE DAHLIA—Robert L. Preston—*The author*. A poetic *potpourri* of horticulture and history.

Science News-Letter, June 18, 1927

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GR Folklore.
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HF Commerce.
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Q Science. General.
QA Mathematics.
QB Astronomy.
QC Physics.
QD Chemistry.
QE Geology.
QH Natural history.
QK Botany.
QL Zoology.
QM Human anatomy.
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SD Forestry.
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SH Fish culture and fisheries.
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TG Bridges and roofs.
TH Building construction.
TJ Mechanical engineering.
TK Electrical engineering and industries.
TL Motor vehicles. Cycles. Aeronautics.
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110 Metaphysics
120 Special metaphysical topics
130 Mind and body
140 Philosophical systems
150 Mental faculties. Psychology
160 Logic
170 Ethics
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190 Modern philosophers
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220 Bible
230 Doctrinal. Dogmatics. Theology
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250 Homiletic. Pastoral. Parochial
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440 French
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460 Spanish
470 Latin
480 Greek
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520 Astronomy
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620 Engineering
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650 Communication. Commerce
660 Chemical technology
670 Manufactures
680 Mechanic trades
690 Building
700 FINE ARTS—
710 Landscape gardening
720 Architecture
730 Sculpture
740 Drawing. Decoration. Design
750 Painting
760 Engraving
770 Photography
780 Music
790 Amusement
800 LITERATURE—
810 American
820 English
830 German
840 French
850 Italian
860 Spanish
870 Latin
880 Greek
890 Minor languages
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## Anniversaries of Science

**June 23, 1924**—Lieut. R. L. Maughan, of the U. S. Army Air Service, flew across the American continent from New York to San Francisco, in 21 hours, 44 minutes.

Using a plane with a wingspread of only 32 feet and a loaded weight of less than 2,800 pounds, Lieut. Russell L. Maughan, speed pilot of the Army Air Service, is making preparations to fulfill his unsatisfied ambition of flying across the continent between daylight and dark of a single day. . . .

The total flying distance from Mitchell Field, Mineola, N. Y., to Crissy Field, The Presidio, San Francisco, is 2,540 miles, which at 160 miles an hour would require 15 hours and 53 minutes flying time. Stops for fuel will be made at Dayton, Ohio, St. Joseph, Mo., Cheyenne, Wyo., and Salduro, Utah. During the next four weeks along the latitude of the flight, the sun will rise about 4:30 and set about 7:30, which with nearly an hour of twilight at each end will make more than 16 hours of daylight available.

Three hours time will be gained by flying westwards, which will give Lieutenant Maughan really 19 hours in which to complete his flight, for when it is 7:30 p. m. at Mitchell Field by Eastern Standard Time it is only 4:30 p. m. at San Francisco and the sun is still three hours high. To offset this gain there will be some loss due to flying against the prevailing westerly winds at the flying levels, but in summer these winds are usually moderate and sometimes absent.

—*Daily Science News Bulletin, Science Service,* June 13, 1924.

**June 26, 1824**—Birth of William Thomson, afterward Lord Kelvin, the distinguished British physicist.

The most fundamental change in the attitude of applied mathematicians has been in the recognition and working out of the consequences of simple fundamental principles or laws. Foremost amongst the latter is that known as the conservation of energy, brought into prominence in the middle of the nineteenth century by the labors of Helmholtz and Kelvin. It is now regarded as the chief invariant of the universe and has been applied to every branch of physics.

—Brown: *Mathematics in The Development of the Sciences.*

**June 27, 1829**—James Smithson died. Although an Englishman, he lived on the Continent and left his fortune "to the United States of America, to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men."

Smithson claimed to be of noble descent; and in his will declares himself the son of Hugh, first Duke of Northumberland, and of Elizabeth, niece of Charles the Proud, Duke of Somerset. He was educated at Oxford, and paid particular attention to the study of the physical sciences; was reputed to be the best chemist in the university, and was one of the first to adopt the method of minute analysis. As an example of his expertness in this line, it is mentioned that on one occasion he caught a tear as it was trickling down the face of a lady, lost half, examined the remainder, and discovered in it several salts. He made about thirty scientific communications to different societies, principally on chemistry, mineralogy, and geology. His scientific reputation was founded on these branches, though, from his writings, he appears to have studied and reflected upon almost every department of knowledge. . . . .

The objects [of the Smithsonian Institution] specified in the act of Congress evidently do not come up to the idea of the testator, as deduced from a critical examination of his will. A library, a museum, a gallery of arts, though important in themselves, are local in their influence. . . . . [The plan] adopted is to stimulate all persons in this country capable of advancing knowledge by original research, to labor in this line—to induce them to send the results to the Institution for examination and publication, and to assist all persons engaged in original investigations as far as the means will allow; also to institute, at the expense and under the direction of the Institution, particular reseaches. This plan has been found eminently practicable, and by means of it the Institution has been enabled to produce results which have made it favorably known in every part of the civilized world.

—Joseph Henry, Secretary of the Smithsonian Institution, in an address published in 1854.

Science News-Letter, June 18, 1927

HYGIENE

## Watch For Typhoid!

The exodus into the great open spaces that begins about now has moved Assistant Surgeon General W. F. Draper, of the U. S. Public Health Service, to urge vacationists to be on the safe side and have a typhoid inoculation before they set out. Typhoid follows in the wake of vacations, especially those taken via automobile, almost more than any other disease, he declared.

"Therefore," the health authority continued, "if means have been devised to avoid the hazard of typhoid fever they should be consciously known and applied as guiding principles in our vacation plans. The germs that cause typhoid fever are usually conveyed through contaminated water, milk or food.

"A safe rule to follow relating to water is to drink water only from known safe supplies. Most city supplies are safe, for chlorination of public water supplies is now almost universal. If you are out of reach of known safe water you should boil the water and make it safe. The only safe milk is pasteurized milk. If then you use only milk that has been effectively pasteurized you may be reasonably assured of safety from this source."

The epidemic of thousands of cases of typhoid fever that has raged all spring in Montreal has led to serious apprehension on the part of federal health officers in this country. Tourists and organizations contemplating sessions in that city are advised to be inoculated if, considering the danger involved, it is still absolutely necessary to include Montreal in their itineraries. For a time an embargo was placed on the shipment of milk into the United States from any point in the area included within a radius of 200 miles of Montreal but this has been modified so that properly certified milk is accepted from Canada except that which has been trans-shipped or handled in the city of Montreal. Many of the cases during the early part of the epidemic are said to have had their origin from contact with typhoid carriers, people who have recovered from the disease but who are still capable of transmitting the contagion.

Children from 10 to 14 years old are the most susceptible, according to statistical studies on typhoid made by the Metropolitan Life Insurance Company. Adolescents in the succeeding years from 15 to 19, though not so susceptible, show the highest death rate, however. The actual danger of a fatal termination in typhoid cases increases continuously with age, as might be expected, and is greatest in old age in the very period where liability to infection is the least.

Science News-Letter, June 18, 1927

EVOLUTION

## Purposive Evolution

A billion years ago, sequestered in
  A lonely stream,
A young Amoeba sprawled upon a
  stone,
  And dreamed a dream.

* * *

There's something in the air of India
  That is unique.
In early times, this fecund potency
  Of which I speak,
Was aptly proved, when Sivapithecus,
  An anthropoid—
An ape of unexampled cleverness,
  Was well employed
In swift mutations leading on to man.

* * *

  Amoeba's bright
Young dream was true at last; for
  he could seize
  A club and fight.

—*Richard Ashman.*

Science News-Letter, June 18, 1927

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